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10/825,098

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EXAMINER

MITCHELL, JASON D

ART UNIT

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2193

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07/09/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/825,098 | Applicant(s) TANI, TAKENOBU | |
| | Examiner Jason Mitchell | Art Unit 2193 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5-16, 19 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-4, 5-16, and 19-20 are pending in this application. Examiner notes that claims 1-4 are indicated as 'withdrawn' in the amendment. Withdrawing a claim is not equivalent to canceling a claim accordingly these claims must be canceled in the next office action.

Response to Arguments

2. Initially, it is noted that the previous action incorrectly cited the Lin reference as US 5,453,401 instead of 5,452,401. This clerical error is corrected in this action.

3. **Applicant's arguments regarding the double patenting rejection (Section IV) have been considered but are moot in view of the new ground(s) of rejection.**

4. **Applicant's arguments regarding "a power control manager, which extracts power control management information by referring to a comment sentenced" (see Section V, pp. 14-16) have been considered but are moot in view of the new ground(s) of rejection.**

Further, in response to Applicant's arguments in the last full paragraph on pg. 15, it should be noted that the claimed "use of a comment statement for extracting power control management information" is defined in applicant's specification as being limited to indicating to a compiler when to begin and end applying the claimed analysis to "detect an operation resource ... begin not actuated for an instruction section having a

predetermined length". And does not prevent anticipatory prior art references from selecting "executable instructions in an instruction program for processing".

5. Applicant's arguments regarding Lin's asserted failure to disclose "making the instruction section ... long" (see Section V. pp. 16-17) have been fully considered but they are not persuasive.

The Applicant argues that while "Lin does appear to disclose changing the order of instructions to maximize the reduction effect on consumption power. ... Lin does not disclose or suggest making the instruction section detected during power control analysis long" (see the 2nd full par. on pg. 16).

The Examiner disagrees. Lin's col. 11, lines 48-54 discloses:

When compiler 802 determines that one or more functional blocks are not used after instruction 1 for some number of cycles, it can send disable or power down signals to those one or more functional blocks in order to stop clocking, block inputs or shut off the power supply, as the case may be, until the one or more blocks are needed in the future.

In light of this disclosure, those of ordinary skill would have recognized that "the power saving produced by [Lin's] invention" (col. 11, lines 25-34) results from 1) the frequency with which functional blocks can be 'powered down' and 2) the length of time for which the functional block can remain 'powered down'. Each of these goals is achieved by increasing the length of an instruction section, which does not use "one or more functional blocks". Further, one of ordinary skill in the art would have understood that the cited "reordering the machine code instructions ... so as to optimize the reduction in power consumption" (col. 11, lines 25-34) describes 1) given a instruction

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section which uses a functional block more often than some number of cycles (i.e. a short section) rearranging the instructions so that the section does not use the functional block for more than some number of cycles (i.e. generating a long section); and 2) given a instruction section which already does not use a functional block for more than some number of cycles, extending the time "until the one or more blocks are needed" (i.e. making the section longer; see col. 11, lines 48-54). Accordingly, it should be seen that the proposed combination does in fact suggest the recited reassembling such that "the instruction section ... is made long".

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first and second paragraphs of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

7. **Claims 7 and 13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement and the enablement requirement.**

The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention and was not described in the specification in such a way as to enable one

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skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

There is no disclosure in the specification regarding the meaning of an 'instruction-wise operation resource table'. Further the disclosed 'operation resource table' appears to be consistently referred to throughout the specification, as being 'instruction-independent'. The plain meaning of these terms (i.e. instruction-wise and instruction-independent) appears to be contradictory.

8. Claims 5-7, 11-13 and 19-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 5 and 11 refer to a "comment sentence". Applicant states that support for this term come from, (at least), par. [0095] of the published application (PGPUB 2004/0260959). This paragraph discloses the use of a 'compiler directive' and more specifically a "#pragma" statement. Those of skill in the art recognize a distinction between a compiler directive or #pragma statement and a comment. Namely, a compiler directive is read and acted upon (executed) by a compiler, where as a comment is generally ignored by the compiler. Applicant's disclosure in par. [0095] does not constituted an explicit redefinition of the term.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled

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in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999).

Further, dependent claims 6-7, 12-13 and 19-20 incorporate the above problems and accordingly are also rejected.

Claims 7 and 13 refer to “a instruction-wise operation resource table”. It is not clear what this language is intended to describe. It is Examiner’s best understanding that this limitation is intended to represent features of the operation resource table 103 as shown in Applicant’s fig. 2. Accordingly the limitation will be read as being directed to a unit creating a table which stores information as to whether or not each of the operations resources ... is actuated by every instruction”.

Double Patenting

9. **Claims 5-6 and 11-12 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 7,191,350 (the ‘350 reference) in view of US 6,064,818 to Brown et al. Brown.** Although the conflicting claims are not identical, they are not patentably distinct from each other because:

10. **Each of Claims 5-6 and 11-12 would have been obvious over either of claims 1 or 2 of the ‘350 reference.**

Specifically, it would at least have been obvious to one of ordinary skill in the art, that the "power control information analysis unit" of the '350 reference would analyze power control information extracted the instruction program it is analyzing.

Further, as indicated in Brown (col. 3, lines 12-22 "A pragma ... is a special purpose instruction to the compiler, typically utilized to turn on or off certain features ... the straight path optimization pragma") those of ordinary skill in the art would have recognized that 'comment sentences' were commonly referred to by compilers to determine optimization strategies.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. **Claims 5, 7, 11, 13 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,790,877 to Nishiyama et al. (Nishiyama) in view of US 6,064,818 to Brown et al. (Brown).**

13. **Regarding Claims 5 and 11:** Nishiyama discloses a computer-readable instruction converting apparatus having instructions stored thereon for optimizing an instruction program so as to suitably execute the optimized instruction program by a predetermined microprocessor, comprising:

a power control manager, which extracts power control management information which is written in the instruction program (col. 5, lines 18-25 "the resource utilization table generation unit 501");

a power control information analyzer, which detects an operation resource based upon the power control management information extracted by the power control manager (col. 5, lines 32-44 "In a step 803, a section of cycle not used by the selected resource is determined by referring [to] the resourced utilization table"), the operation resource being not actuated for an instruction section having a predetermined length when the predetermined microprocessor is operated (col. 5, lines 32-44 "If the number of cycles not used by the resource is larger"); and

a power control instruction applier, which inserts or replaces an instruction related to a power control operation to the instruction program based upon the detected result of the power control information analyzer (col. 5, lines 39-43 "In the step 805, an instruction to lower the clock frequency of the hardware resource is inserted").

14. Nishiyama does not disclose the power control manager referring to a 'comment sentence'.

15. Brown teaches referring to a 'comment sentence' which is written in an instruction program and is not executed at run-time (col. 3, lines 12-22 "A pragma ... is a special purpose instruction to the compiler, typically utilized to turn on or off certain features").

16. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have Nishiyama's power control manager reference a 'comment sentence' as taught by Brown (col. 3, lines 12-22) because "Pragmas are generally preferable to comparable compiler options" (Brown col. 3, lines 12-22).

17. **Regarding Claims 7 and 13:** The rejections of claims 5 and 11 are incorporated respectively; further Nishiyama discloses:

a instruction-wise operation resource table storing unit, which stores information as to whether or not each of the operation resources of the predetermined microprocessor is actuated by every instruction (col. 5, lines 18-25 "the resource utilization table 504"; Fig. 6, Resource Utilization Table 504);

wherein the power control information analyzer detects such an operation resource which is not actuated for the instruction section having the predetermined length when the predetermined microprocessor is operated based upon the information stored in the instruction-independent operation resource table storage unit (col. 5, lines 32-44 "In a step 803, a section of cycle not used by the selected resource is determined by referring [to] the resourced utilization table").

18. **Regarding Claim 19:** The rejection of claim 11 is incorporated; further Brown discloses, wherein:

The information contains information for designating a portion in the instruction program where the power control information analyzing step is performed (col. 3, lines 12-22 "A pragma ... typically utilized to turn on ... certain features"), and

and the information indicates an instruction section analyzed is not the portion where the power control information analyzing step is performed (col. 3, lines 12-22 "A pragma ... typically utilized to turn ... off certain features").

19. **Regarding Claim 20:** The rejection of claim 11 is incorporated; further Nishiyama discloses instructions designating a kind of resource (col. 4, lines 36-41 "In this instruction, the resource designated by a resource designation operand "resource" 301").

The Nishiyama-Brown combination does not explicitly disclose the information for designating a kind of operation resource retrieved from a 'comment sentence'.

20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include Nishiyama's "resource designation" (col. 4, lines 36-41) in a "#pragma" statement as taught in Brown (col. 3, lines 12-22) in order to control optimization of only the individual resource type (col. 4, lines 52-60 "the frequency of the hardware resource ... is individually set low by the compiler to suppress the power consumption").

21. **Claims 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,790,877 to Nishiyama et al. (Nishiyama) in view of US 6,064,818 to Brown et al. (Brown) further in view of US 5,452,401 to Lin (Lin).**

22. **Regarding Claims 6 and 12:** The rejections of claims 5 and 11 are incorporated respectively; further Nishiyama discloses:

the power control management information contains information for designating said predetermined length of the instruction section (col. 5, lines 34-37 “whether the number of cycles not used by the resource is larger than the number of cycles required to change the clock”).

23. The Nishiyama-Brown combination does not explicitly disclose the power control information analyzer changes the predetermined length of the instruction section based upon power control management information

24. Lin discloses changing the predetermined length of the instruction section based upon the power control management information (col. 4, lines 41-50 “Any suitable preselected amount of time can be used ... for turning on and for turning off the functional units”).

25. It would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the teachings of Nishiyama-Brown and Lin because one of ordinary skill in the art would have been motivated to further conserve power (Lin col. 3,

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lines 54-59 "the present invention results in a very significant reduction in power consumption").

26. Claims 8-9 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,790,877 to Nishiyama et al. (Nishiyama) in view of US 5,452,401 to Lin (Lin).

27. Regarding Claims 8 and 14: Nishiyama discloses a computer-readable instruction converting apparatus having instructions stored thereon for optimizing an instruction program so as to suitably execute the optimized instruction program by a predetermined microprocessor, comprising:

a power control analyzer, which detects an operation resource which is not actuated for an instruction section having a predetermined length when the predetermined microprocessor is operated (col. 5, lines 32-44 "In a step 803, a section of cycle not used by the selected resource is determined by referring [to] the resourced utilization table"); and

a power control instruction applier, which inserts or replaces an instruction related to a power control operation in the instruction program based upon the detection result of the power control information analyzer (col. 5, lines 39-43 "In the step 805, an instruction to lower the clock frequency of the hardware resource is inserted");

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28. Nishiyama does not disclose reassembling the instruction program in such a manner that the instruction section is made long.

29. Lin teaches an instruction reassembling unit, which reassembles the instruction program in such a manner that the instruction section detected during power control analysis is made long, during which an actuation of an operation resource can be stopped (col. 11, lines 25-28 "an optimizing compiler 802 to order the machine code instructions in a way which maximizes the power saving").

30. It would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the teachings of Nishiyama and Lin because one of ordinary skill in the art would have been motivated to "maximize the power saving" (Lin, col. 11, lines 25-28).

31. **Regarding Claims 9 and 15:** The rejections of claims 8 and 14 are incorporated respectively; further Lin teaches:

the instruction reassembling unit corresponds to instruction rearranging unit which rearranges instructions while maintaining an instruction dependent relationship established in the instruction program (col. 11, lines 15-24 "This decoded information may take the form of data dependency information").

32. **Claims 10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,790,877 to Nishiyama et al. (Nishiyama) in view of US 5,453,401 to Lin (Lin) in view of 2006/0168463 to Terechko et al. (Terechko).**

33. **Regarding Claims 10 and 16:** The rejections of claims 8 and 14 are incorporated respectively; further the Nishiyama-Lin combination does not teach replacing one instruction contained in the instruction program with another instruction.

34. Terechko teaches replacing one instruction contained in the instruction program by another instruction having the same process result as that of the one instruction (par. [0068] "it may be desirable to remap registers to concentrate the registers within a reduced number of register banks").

Conclusion

35. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Each of 2004/0154006, 2004/0098713 and 2003/0149964 discuss 'pragma' statements as a means of directing the optimization of a containing source code program.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Mitchell whose telephone number is (571) 272-3728. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Jason Mitchell/

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